

ported for February. Within an area extending over the northern part of the Panhandle of Texas, and thence westward over northeastern New Mexico, and in south-central New Mexico and extreme western Texas no precipitation was reported; and at stations in southeastern North Carolina, western Florida, south-central North Dakota, southern New Mexico, and southeastern Arizona the precipitation was the least ever reported for February. The greatest depth of snowfall was reported along the line of the Central Pacific Railroad in Placer county, Cal., where it amounted to one hundred and forty-nine inches at Cisco, and the great depth of snow in cuts along the line of the railroad crossing the summit of the Sierra Nevada Mountains caused serious interruption to the train service throughout a greater portion of the month.

Lakes Erie and Huron were reported practically open to navigation during the month. Very destructive floods occurred in western Oregon and northern California during the early part of the month. The rivers were generally above the danger line in the Ohio, Cumberland, Tennessee, and lower Mississippi valleys during the latter part of the month, and great damage was caused by the overflow of streams in Ohio and west-central Kentucky. The Verde and Gila rivers, Arizona, overflowed their banks, and a large storage dam on the Hassayampa River, Arizona, gave way, causing loss of life and destruction of property.

Unusually well-defined and brilliant parhelia were observed at Milwaukee, Wis., during the afternoon of the 16th, and at Era, Idaho, during the morning of the 25th.

### ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for February, 1890, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart ii by isobars. The departure of the mean pressure for February, obtained from observations taken twice daily at the hours named from that determined from hourly observations, varied at the stations named below, as follows:

Station.	Departure.	Station.	Departure.
Eastport, Me. ....	+ .008	Saint Louis, Mo. ....	+ .003
Boston, Mass. ....	+ .012	Chicago, Ill. ....	+ .005
New York City. ....	+ .009	Saint Paul, Minn. ....	+ .002
Philadelphia, Pa. ....	+ .010	New Orleans, La. ....	— .005
Washington City. ....	+ .004	Galveston, Tex. ....	— .002
Savannah, Ga. ....	+ .009	Santa Fe, N. Mex. ....	— .012
Buffalo, N. Y. ....	+ .012	Denver, Colo. ....	— .004
Detroit, Mich. ....	+ .005	Salt Lake City, Utah. ....	— .003
Cincinnati, Ohio. ....	+ .007	San Francisco, Cal. ....	— .017
Memphis, Tenn. ....	+ .002	San Diego, Cal. ....	— .015

For February, 1890, the mean pressure was highest within an area which extended from the middle Missouri valley northward and northwestward to the Saskatchewan Valley, where it was above 30.15, and where, at Swift Current, N. W. T., a mean reading of 30.24 was reported. The mean values were also above 30.15 along the Atlantic coast between the twenty-seventh and thirty-fifth parallels. From central New England southwestward to the east Gulf coast, in the interior of the country between the Mississippi River and the Rocky Mountains and north of the thirty-seventh parallel, and in west-central California the mean pressure was above 30.10. The mean pressure was lowest on the north Pacific coast, where it fell below 30.00, the lowest mean reading, 29.96, being noted at Fort Canby, Wash., and the mean values fell below 30.00 at stations in the eastern part of the middle plateau.

A comparison of the pressure chart for February, 1890, with that of the preceding month shows but slight changes in the positions of the areas of highest and lowest pressure. There has been an eastward movement of the area of high pressure over the southeastern states, and a decrease in mean pressure of about .15 of an inch at south Atlantic coast stations, and within the area of high pressure central in each month over and north of the middle Missouri valley there has been a decrease in mean pressure of about .10 of an inch from North Dakota to Kansas, and a slight decrease in the Saskatchewan Valley. Within the area of low pressure which occupied the north Pacific coast for each month there has been an increase in mean pressure of more than .10 of an inch. In the preceding month there was a range in mean pressure of more than .45 between the Atlantic and Pacific coasts, and a range of more than .40 between the middle Missouri valley and the Pacific coast, while for the current month the ranges in mean pressure between the Atlantic and Pacific coasts amounted to but .20, and the range between the middle Missouri valley and the Pacific coast varied from .15 to .20. The changes in mean pressure referred to caused a decrease in pressure over the en-

tire country, except on the north Pacific coast; the most marked decrease in pressure being shown over the southeastern part of the country, where the mean pressure for February was more than .15 lower than for the preceding month, while on the north Pacific coast near the mouth of the Columbia River there was an increase in mean pressure of more than .10.

The mean pressure for February, 1890, was generally above the normal at Atlantic coast stations from the Gulf of Saint Lawrence to southern Florida, and in the middle and upper Missouri and Red River of the North valleys; elsewhere it was generally below the normal. The greatest departures above the normal pressure occurred in Nova Scotia, New Brunswick, and over a greater part of New England, where they exceeded .05, and the most marked departures below the normal pressure were noted from Arkansas and Indian Territory southward to the west Gulf coast, and from the north Pacific coast southeastward to northern Nevada and northern Utah, where they were more than .05.

### BAROMETRIC RANGES.

The monthly barometric ranges at the several Signal Service stations are shown in the table of miscellaneous meteorological data. The general rule, to which the monthly barometric ranges over the United States are found to conform, is that they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. In February, 1890, the monthly ranges were greatest over extreme eastern New England, where they exceeded 1.50, whence they decreased southward to less than .30 over southern Florida, westward to less than 1.15 in the upper Missouri valley, from which region they increased to more than 1.35 in the upper valley of the Columbia River, and thence decreased to 1.20 on the north Pacific coast. Along the Atlantic coast the monthly ranges varied from .27 at Key West, Fla., to 1.53 at Eastport, Me.; between the eighty-second and ninety-second meridians, .46 at Cedar Keys, Fla., to 1.35 at Sault de Ste. Marie, Mich.; between the Mississippi River and the Rocky Mountains, .71 at Corpus Christi, Tex., to 1.23 at Bismarck, N. Dak.; in the Rocky Mountain and plateau regions, .47 at Fort Grant, Ariz., to 1.38 at Spokane Falls, Wash.; on the Pacific coast, .42 at San Diego, Cal., to 1.20 at Fort Canby, Wash.

### AREAS OF HIGH PRESSURE.

Nine areas of high pressure were observed during the month of February, four of which first appeared in the regions north of North Dakota and Montana; three approached from the north Pacific coast; and two from the Hudson Bay region. Seven of these areas of high pressure were traced eastward to the Atlantic coast, the general direction of movement being slightly to the south of east; two disappeared by gradual decrease of pressure west of the Mississippi. Those areas of high pressure observed on the Pacific coast were apparently moving in a northeasterly direction when first observed, but after passing to the east of the coast line the direction of

movement changed to the southeast. One disappeared while central over Texas; one after reaching the central Rocky Mountain region passed directly eastward to the Atlantic coast, and the third after crossing the Rocky Mountains to the north of Montana passed eastward to the Atlantic coast.

The following is a general description of the weather conditions attending the movement of each area of high pressure observed during the month:

I.—The month opened with abnormally high pressure north of the Lake region, while the pressure was abnormally low on the north Pacific coast, north of North Dakota, and northeast of New England. By the morning of the 2d the pressure had increased along the Atlantic coast, the centre of greatest pressure being near Halifax, N. S., where the barometer had risen about three-fourths of an inch in twenty-four hours. The storm on the Pacific coast had moved eastward, extending over the northern Rocky Mountain region, and a well-marked barometric gradient existed between Nova Scotia and Montana, the difference of barometric pressure being about one and one-half inch. The barometric pressure decreased rapidly on the north Atlantic coast during the 2d, the principal area of high pressure apparently moving eastward from Nova Scotia, while the barometer continued high over the Southern States east of the Mississippi.

II.—During the easterly movement of the storm previously referred to as central on the Pacific coast, this area of high pressure appeared to the north of Montana, and the movement of cold air to the southward during the 2d resulted in the formation of an area of low pressure over Lake Superior, while that over Montana was apparently forced to the westward. It passed rapidly eastward north of the Lake region to the Saint Lawrence Valley where it disappeared quickly during the 4th, owing to the advance of a depression from the Lake region.

III.—This area of high pressure had its origin in the same locality as that given to the preceding one, and passed eastward north of the Lake region to the Saint Lawrence Valley, but slightly to the south of the course pursued by the previous area. It also increased in intensity during the easterly movement, and while passing over New England on the 7th the attending conditions were felt as far south as Florida. The pressure increased during the easterly movement, and the maximum, 30.78, occurred at Halifax, N. S., on the 7th when the centre was near that station. Strong northeasterly gales occurred off the south New England and south Atlantic coasts during the 6th and 7th, while this area was passing eastward from the Saint Lawrence Valley.

IV.—Was observed north of Montana on the 7th, while the previous reports indicate that it probably had its origin over the north Pacific. The telegraphic reports of the 6th show that an area of high pressure covered the Pacific coast and plateau regions, and that the direction of movement was to the north of east, following an area of low pressure from the Pacific coast. After passing to the east of the Rocky Mountains on the 7th, it moved eastward north of the Lake region, while a secondary area of high pressure developed over Indian Territory and moved to the northeastward, passing over the Ohio Valley during the 8th and over the lower lake region during the 9th, uniting with the principal area of high pressure far to the north of Lake Ontario on the afternoon of that date. After reaching the Saint Lawrence Valley the direction changed to southward, and on the morning of the 11th it was central over New England, and included within its area the greater portion of the southern, middle, and New England states. It disappeared to the eastward of the Atlantic coast during the 11th.

V.—Was first observed on the north Pacific coast on the 10th, although there was some indication of its approach from the westward on the 9th. A well-marked area of low pressure covered the central Rocky Mountain region on the morning of the 10th, and this was forced to the southward over the Rio Grande Valley and apparently into the west Gulf by the advance of this area of high pressure over the Rocky Mountain

region. On the 12th it included within its area the entire country except the Saint Lawrence Valley and northern New England, it being central over western Colorado. It moved eastward from Colorado during the 12th, attended by generally fair weather, the pressure decreasing rapidly during the easterly movement, and it disappeared to the east of the coast line during the 13th.

VI.—This area of high pressure also appeared on the Pacific coast, where it was observed on the 13th. It moved eastward south of the course followed by the previous area, passing from the north Pacific coast over the central plateau region on the 13th, crossing the central Rocky Mountain region on the 14th, and over southern Texas on the 15th, where it disappeared.

VII and VIII.—On the 15th these areas of high pressure were observed to the north of Montana and Minnesota, the former apparently being secondary, which separated from the principal area and moved southward to the Saint Lawrence Valley during the 15th, and extended southward over the eastern portion of the United States on the 16th, disappearing to the east of the south Atlantic coast on the night of the 16th, although the pressure in that region remained relatively high until the morning of the 18th. The principal area of high pressure, number viii, remained almost stationary during five days, covering the region north of Montana and North Dakota from the 15th to the 20th, inclusive, and extending southward over the eastern slope of the Rocky Mountains to Texas on the 20th, while the centre remained north of Montana. On the 21st it moved rapidly southeastward and its influence was felt over the entire country east of the Rocky Mountains. It was central over Illinois on the afternoon of the 21st, extending from the Gulf to the north of the Lake region and from the Atlantic coast to Colorado. The southeasterly movement continued during the 22d, and although the pressure decreased rapidly at the centre, this area was readily located on the 8 p. m. weather map of the 22d off the south Atlantic coast, and the succeeding reports indicate that the southeasterly movement continued after that date.

IX.—Was observed north of Montana on the 23d, and, as in the case of the previous area, remained almost stationary in that region, no decided movement being observed from the 23d until the 26th, after which this area extended rapidly southward over the eastern slope of the Rocky Mountains, while a secondary area formed over the northern plateau region to the west of the Rocky Mountains. These two areas moved to the southward, attended by the most severe cold wave of the month over the central valleys and Southern States. Killing frosts occurred in southern California, a severe norther in Texas, and the coldest weather of the season in the Southern States occurred during the passage of the cold wave attending this area of high pressure.

#### AREAS OF LOW PRESSURE.

Fifteen areas of low pressure were observed during the month of February, seven of which were traced from the Pacific coast or plateau region; eleven reached the Atlantic coast or the Saint Lawrence Valley; and but one passed eastward south of New England. The general direction of movement was to the south of east while the centres remained west of the one hundredth meridian, and this direction continued to the east of that meridian in the cases where the areas of low pressure passed eastward over the British Possessions, but the eight areas of low pressure which passed eastward over the eastern slope of the Rocky Mountains, within the limits of the United States, all moved to the north of east, the direction of the movement inclining more to the northward in those areas passing over the lower latitudes. Compared with previous months the areas of low pressure were more numerous, and have extended southward over the western half of the continent, while the region of greatest frequency continues over the Saint Lawrence Valley. The following is a brief description of the movements of each area of low pressure, obtained from the daily weather charts:

**O I and II.**—At the opening of the month a storm of considerable energy was central on the north Pacific coast, where heavy rains and southerly gales continued during the 1st and 2d. This storm advanced eastward to the Rocky Mountain regions, and on the morning of the 2d a trough of low pressure extended from Minnesota westward to the Pacific. The advance of an area of high pressure from the northward resulted in the formation of two disturbances, one of which continued its easterly course north of the Lake region to the lower Saint Lawrence valley, where it disappeared after the 3d, and the other, after being forced slightly to the southward over Montana during the 2d, was replaced by increase of pressure over that section, the barometer remaining low, however, on the north Pacific coast, where low area number ii quickly formed, attended by continued heavy rains and strong southerly gales on the 3d. This storm also passed to the eastward along the northern border of the United States, following the same general course as that given to number i, but over the west half of the continent the centre of disturbance was slightly to the north of the track of number i, while over the east half it was slightly south of it. Both of these disturbances were attended by general rains, but the latter was much more intense, and caused dangerous gales in the Lake region and along the Atlantic coast north of Hatteras, N. C., from the 4th to the 6th. In the case of number ii the barometer continued to fall at the centre during the easterly movement from the centre of the continent, although there was a slight increase during the transit from the north Pacific coast to Manitoba. On the Pacific coast the barometer was 29.24 on the 3d. At Saint Vincent, Minn., it was 29.36 on the 4th, and at Father Point, Quebec, it was 29.02 on the 5th, and probably 28.96 at Bird Rocks, Gulf of Saint Lawrence, on the 5th. It will be seen from chart i that low areas i and ii are the only disturbances that passed eastward from the Pacific to the Atlantic coasts attended by such conditions as to render it possible to locate the centre of the disturbance at each telegraphic report.

**O III.**—Was a feeble barometric disturbance which apparently developed over the southern plateau region during the 5th, and, although not clearly defined, it apparently moved southeastward to the lower Rio Grande valley, the southeasterly course being due to the existence of an area of high pressure to the northeast. After reaching southern Texas it increased greatly in energy and was attended by very heavy rains in the above named state, and on the west Gulf coast high southerly winds were quickly followed by a norther as the centre passed to the eastward. After the disturbance reached the southern portion of Georgia, attended by high winds in northern Florida on the 8th, it disappeared to the eastward, the telegraphic reports indicating that the storm was decreasing in energy.

**O IV.**—Was a depression in the northern portion of the barometric trough which extended over the Rocky Mountain regions on the 6th, within the southern portion of which developed the storm traced as number iii. This depression moved from the region north of Montana to near Lake Superior during the 6th, thence southward to Lake Michigan on the 7th, and in connection with low area number iii, which at that time was passing over the east Gulf states, the storm area included the eastern half of the United States. After reaching Lake Michigan the direction of movement changed to northeast, and the storm passed down the Saint Lawrence valley with increasing force, the barometer falling to 29.14 at Anticosti, Gulf of Saint Lawrence, on the 8th, when the centre was near that station. The westerly gales attending this storm were most severe in the lower lake region and on the North Carolina coast, where a maximum velocity of 60 miles per hour was reported. Westerly gales also occurred in the Maritime Provinces, where they continued until the 9th.

**V and VI.**—Appeared on the north Pacific coast on the 7th and 9th, respectively, and after moving eastward to the region north of Montana, the former passed southeastward over the upper Missouri valley and disappeared before reaching the Lake region, while the latter followed rapidly southward over

the Rocky Mountain regions to the Rio Grande Valley, attended by general snows and followed by a cold wave and high northerly winds along the eastern slope of the Rocky Mountains. The centre of this disturbance cannot be definitely traced after it reached the central Rio Grande valley, but reports indicate that it passed over the west Gulf.

**VII.**—When the area of low pressure traced as number vi was central over Texas on the 11th, a trough of low pressure extended northeastward to Lake Superior, where number vii was first located. It passed directly eastward to the Saint Lawrence Valley, attended by light snows in northern New England and the Lake region, but caused no marked change in the weather conditions over other sections of the United States.

**O VIII and IX.**—These disturbances, although widely separated, occupied the northern and southern extremities of an extended barometric trough which moved eastward from the Rocky Mountains. The northerly disturbance was first observed north of Montana on the 12th. It moved toward the Lake region, reaching Lake Superior on the afternoon of the 13th, while the southern storm was central over Arkansas. During the succeeding twenty-four hours these depressions moved directly towards the upper Saint Lawrence valley, where they united on the afternoon of the 14th. The southerly disturbance was much more intense, and was attended by severe local storms as it passed over the central valleys, the rainfall being very heavy in the lower Mississippi valley and its tributaries. This storm also increased in energy after the union of the two disturbances, the course being to the northeast in the direction of the Saint Lawrence Valley. Strong westerly gales prevailed north of Hatteras, N. C., during the passage of this storm over the middle Atlantic and New England states, and they continued on the Atlantic coast until the 16th after the centre of disturbance had passed beyond Nova Scotia.

**O X and XI.**—From the 14th to the 16th this disturbance remained almost stationary on the north Pacific coast, and although there was apparently a slow southerly movement the centre of disturbance could only be approximately located. The depression extended eastward on the 14th and 15th, but was apparently forced to the westward by the advance of an area of high pressure over Montana and the Dakotas, the secondary disturbances which had formed in the Rocky Mountain regions on the 15th filling up, owing to the advance of the area of high pressure. On the afternoon of the 16th this storm was clearly defined as central in northern Oregon, while the trough of low pressure which extended southeastward to Texas and thence northeastward to the upper lake region around the area of high pressure contained secondary disturbances central over Iowa and Kansas. The telegraphic reports of the 17th show an easterly movement of the principal secondary disturbance to the Lake region, attended by light rains, also a feeble depression over the central plateau region, and abnormally low pressure on the north Pacific coast. The depression over the plateau region became more clearly defined during the 18th, and advanced eastward and covered the central and eastern slopes of the Rocky Mountains on the morning of the 19th, after which the movement to the northeast over the central valleys and lower lake region was rapid, owing to the advance of a cold wave from the Northwest. The centre of disturbance reached the region of Lake Huron on the morning of the 20th, from which region it passed directly eastward to southern Nova Scotia, where the minimum pressure of the month, 28.92, was observed at Halifax, N. S., when the centre was near that station on the afternoon of the 20th. The gales attending this storm were unusually severe on the New England coast. This storm apparently moved northward from Halifax, N. S., the barometer at Anticosti, Gulf of Saint Lawrence, falling from 29.36 to 28.98 from 8 p. m. of the 20th to 8 a. m. of the 21st, the current velocity at that station being forty miles from the northwest, while at the same report the station at Sydney, C. B. I., reported 29.26, wind twenty-two miles southwest, maximum velocity forty miles.

**XII.**—Was an extended area of low pressure which appeared

on the northern California coast on the 20th, and moved south-eastward over the plateau and Rocky Mountain regions during the 21st and 22d, reaching the lower Rio Grande valley on the morning of the 23d, unattended by any unusual disturbance, although it was preceded by high southerly winds on the Texas coast when central in the upper Rio Grande valley.

XIII and XIV.—During the 22d the pressure was unusually low along the entire northern border of the United States from the Rocky Mountains eastward to the lower Saint Lawrence valley. On the morning of the 23d this disturbance was apparently central far to the north of Minnesota. It moved to the southeastward over Lake Superior during the succeeding twenty-four hours, reaching southern Michigan on the afternoon of the 24th, after which it disappeared, owing to the formation of an extended low area central over Texas and the advance of a cold wave from the Northwest. Although chart i indicates that low area traced as number xiv developed over Texas on the 24th, it may have originated in the central Rocky Mountain region within the trough of low pressure which

bounded the area of high pressure advancing from the north. With the advance southward of the cold wave over the eastern slope of the Rocky Mountains during the 25th this disturbance moved rapidly to the northeast, the pressure increasing at the centre of disturbance during the easterly movement. General rains occurred throughout the greater portion of the United States east of the Rocky Mountains during the passage of this storm, except in the northwest quadrant where the precipitation was in the form of snow.

XV.—The southerly movement of the cold wave over the Northwest and central valleys during the 24th and 25th apparently forced this disturbance from Colorado westward to Utah, after which it moved southeastward over the Rio Grande Valley and around the area of high pressure, increasing greatly in intensity after reaching the lower Mississippi valley, from which region it moved rapidly northeastward to Lake Erie, followed by the most decided cold wave of the month. This disturbance was central north of Lake Huron at the close of the month.

TABLE I.

Barometer.	First observed.			Last observed.		Duration.	Velocity per hour.	Maximum abnormal changes in pressure in twelve hours, with maximum abnormal changes in temperature and maximum wind velocities in connection therewith.																
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Rise.	Station.	Date.	Fall.	Station.	Date.	Miles per hour.	Direction.	Station.	Date.							
High areas.		°	°	°	°	Days.	Miles.	Inch.																
I.....	1	48	82	46	59	1.5	41	.68	Rockliffe, Ont.....	1	32	Chatham, N. B.....	1	44	w.	Montreal, Quebec.....								
II.....	2	54	112	50	73	2.0	40	.82	Port Arthur, Ont.....	3	40	Bismarck, N. Dak.....	2	42	w.	Northfield, Vt.....								
III.....	4	56	110	45	65	3.0	34	1.04	do.....	5	44	Fort Buford, N. Dak.....	4	72	nw.	Fort Buford, N. Dak.....								
IV.....	5	38	127	44	72	5.5	31	.78	Winnipeg, Man.....	7	28	Fort Sully, S. Dak.....	7	64	nw.	Bismarck, N. Dak.....								
V.....	10	48	127	38	72	3.5	40	.64	Denver, Colo.....	10	25	Cheyenne, Wyo.....	10	60	n.	Fort Elliott, Tex.....								
VI.....	13	43	126	33	97	2.5	33	.42	Medicine Hat, N. W. T.....	13	33	Saint Vincent, Minn.....	13	48	nw.	Winnemucca, Nev.....								
VII.....	15	52	88	35	72	1.5	44	.62	Fort Sill, Ind. T.....	14	33	Quebec, Quebec.....	15	46	nw.	Block Island, R. I.....								
VIII.....	15	55	108	32	79	7.5	14	.58	Kingston, Ont.....	15	40	Fort Custer, Mont.....	15	52	nw.	do.....								
IX.....	23	54	115	39	105	5.0	15	.58	Chicago, Ill.....	20	38	San Antonio, Tex.....	27	72	n.	Rio Grande City, Tex.....								
IX a.....	26	47	118	40	110	2.0	17	.48	Brownsville, Tex.....	28	39	Santa Fé, N. Mex.....	27	34	sw.	Ft. Assiniboine, Mont.....								
Mean.....	49	111	40	80	3.4	31		.66	Montrose, Colo.....	27	23			53										
Low areas.									Fall.		Rise.													
I.....	1	48	125	57	61	2.5	55	.70	Sydney, C. B. I.....	3	36	Bismarck, N. Dak.....	1	68	s.	Fort Canby, Wash.....								
II.....	3	55	125	47	57	2.5	58	.98	Father Point, Quebec.....	5	29	Minnedosa, Man.....	3	72	s.	do.....								
III.....	5	36	112	32	83	2.5	31	.24	Santa Fé, N. Mex.....	6	8	Fort Elliott, Tex.....	6	44	nw.	Pensacola, Fla.....								
IV.....	6	52	109	49	61	2.5	45	1.20	Anticosti Island, G. of S. L.....	8	30	Ft. Assiniboine, Mont.....	6	52	s.	El Paso, Tex.....								
V.....	7	49	124	46	92	2.0	37	.76	Swift Current, N. W. T.....	8	25	Denver, Colo.....	8	52	s.	Sandy Hook, N. J.....								
VI.....	9	50	126	30	101	2.0	58	.34	Qu'Appelle, N. W. T.....	9	27	Brownsville, Tex.....	10	40	sw.	Fort Canby, Wash.....								
VII.....	11	48	87	48	64	1.5	35	.52	Huron, S. Dak.....	10					sw.	Dodge City, Kans.....								
VIII.....	12	54	109	45	75	2.5	31	.72	Quebec, Quebec.....	12	25	Montreal, Quebec.....	12	36	s.	Fort Elliott, Tex.....								
IX.....	13	32	95	49	66	2.0	45	.66	Montreal, Quebec.....	12	19	Moorhead, Minn.....	12	42	sw.	Buffalo, N. Y.....								
X.....	10	51	125	49	60	7.0	26	1.30	Minnedosa, Man.....	12	20	Norfolk, Va.....	14	48	s.	Ft. Assiniboine, Mont.....								
XI.....	16	39	100	42	67	3.0	26	.28	Chatham, N. B.....	15	20	Halifax, N. S.....	20	56	nw.	Atlantic City, N. J.....								
XII.....	20	40	123	33	103	2.5	23	.30	Halifax, N. S.....	20	31	Parry Sound, Ont.....	20	56	nw.	Father Point, Quebec.....								
XIII.....	20	40	123	33	103	2.5	23	.30	Boston, Mass.....	18	22	Abilene, Tex.....	22	44	w.	Sandy Hook, N. J.....								
XIV.....	24	33	100	43	67	2.5	36	.24	Memphis, Tenn.....	22	20	Moorhead, Minn.....	22	36	sw.	Quebec, Quebec.....								
XV.....	24	42	107	50	75	4.5	33	.42	Cairo, Ill.....	22	21	Washington City.....	25	40	n.	Montreal, Quebec.....								
Mean.....	45	111	44	74	2.7	37		.62	Swift Current, N. W. T.....	22	18	Fort Sill, Ind. T.....	24	40	n.	Pueblo, Colo.....								
									Atlantic City, N. J.....	25	28	Minnedosa, Man.....	27	52	sw.	Ft. Assiniboine, Mont.....								
									Saugeen, Ont.....	28	20						Green Bay, Wis.....							
											23						Fort Stanton, N. Mex.....							

## NORTH ATLANTIC STORMS FOR FEBRUARY, 1890 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the depressions that appeared over the north Atlantic Ocean during February, 1890, are shown on chart i. These paths have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Eight depressions have been traced for February, 1890, the average number traced for the corresponding month of the last seven years being ten. The greatest number of depressions previously traced for February was twelve, in 1887, and the

least number was seven, in 1889. All of the depressions traced for the current month advanced eastward from the American continent north of the fortieth parallel; two of the depressions moved to the British Isles; four passed north of the region of observation between the fifteenth and thirty-fifth meridians; and two apparently dissipated before reaching the fortieth meridian. The average path of the depressions was more northerly than the usual February tracks of storms over the north Atlantic, and no severe storms were reported south of the fortieth parallel.

The movements of areas of high pressure over the north Atlantic during the month were as follows: On the 1st the